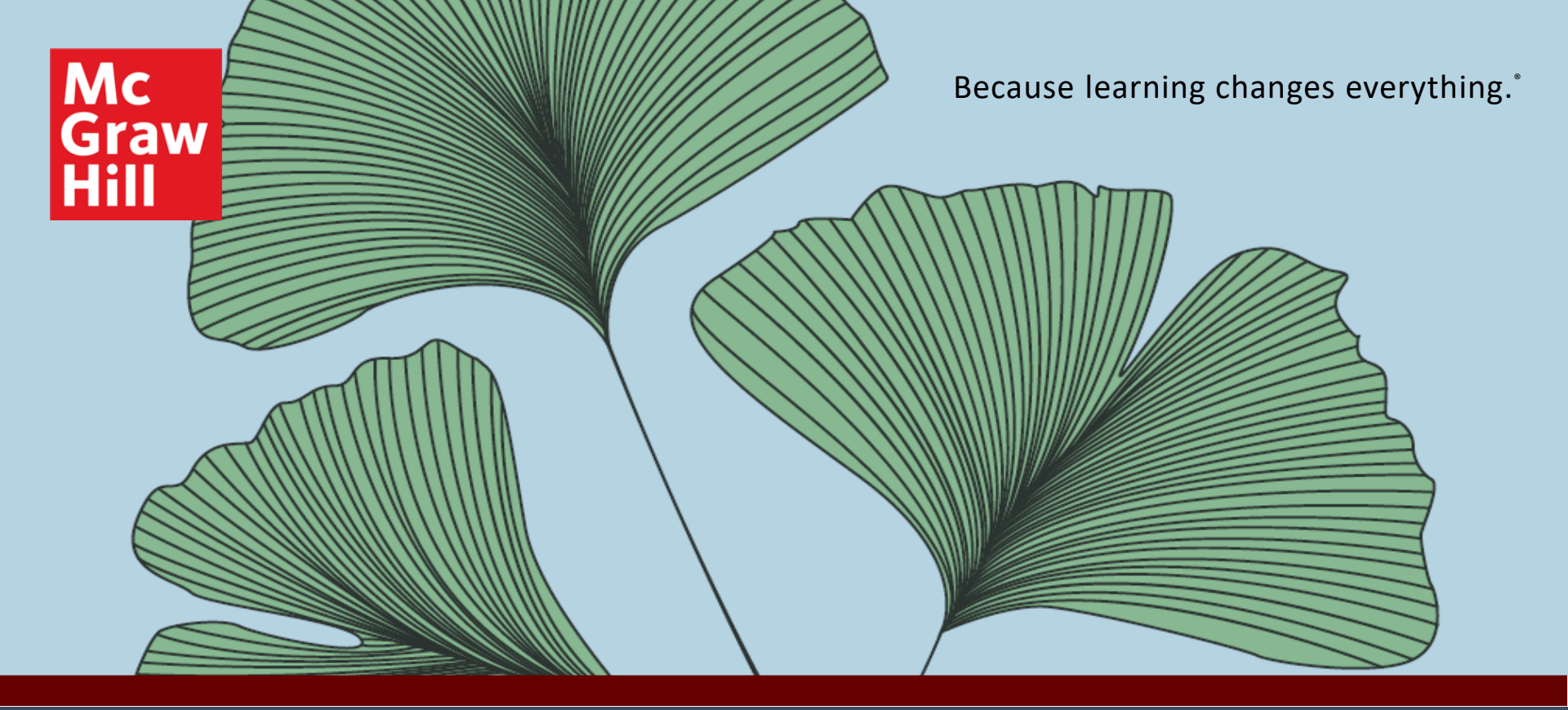

Chapter 13

Exchange Rates and the Open Economy

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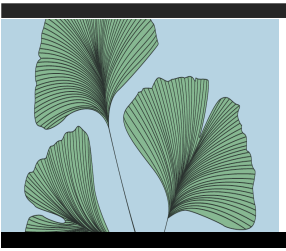

Learning Objectives

1. Define the nominal exchange rate, fixed versus flexible exchange rates, and real exchange rates.
2. Summarize the law of one price and understand how purchasing power parity determines the long-run real exchange rate.
3. Use supply and demand to analyze how the nominal exchange rate is determined in the short run.
4. Explain how monetary policy impacts the exchange rate.
5. Detail how exchange rates can be fixed.
6. Discuss the advantages and disadvantages of flexible versus fixed exchange rates.

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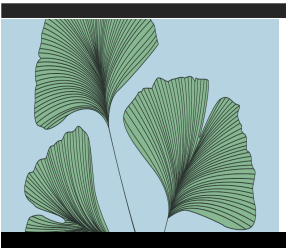

Importance of Exchange Rates

Domestic purchases are made with local currency.

- Purchasing goods abroad requires converting your local currency to their local currency.
  - The exchange rate measures the rate of conversion.

Exchange rates are set in the foreign exchange market, with a small number of exceptions.

- Rates are determined by supply and demand.
- Affect the value of imported goods and the value of financial investments made across borders.
  - Changes in exchange rates can have a significant effect on most economies.

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Nominal Exchange Rates [1]

- The **nominal exchange rate** is the rate at which two currencies can be traded for each other.

Rates for March 8, 2020	Foreign Currency / Dollar	Dollar / Foreign Currency
UK (£)	0.7665	1.3047
Canada (Canadian $)	1.3413	0.7455
Mexico (peso)	20.1091	0.0497
Japan (¥)	105.29	0.00950
China (¥)	6.9320	0.1443
European Union (€)	0.8861	1.1286
South Korea (₩)	1,188.80	0.0008412

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Nominal Exchange Rates 2

Consider 3 currencies: $, C$, and £.

- One dollar buys £ 0.7665 or C$ 1.3413.
- The exchange rate between UK pounds and Canadian dollars can be calculated from this information.

£0.7665 = C$1.3413

£1 = C$1.3413 / 0.7665

£1 = C$1.7498

OR

C$ 1 = £ 0.7665 / 1.3413

C$1 = £0.5715

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U.S. Nominal Exchange Rate, 1973-2020

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Changes in Exchange Rates

Appreciation is an increase in the value of a currency relative to other currencies.

- Example: U.S. dollar appreciates when it goes from $1 = £ 0.5 to $1 = £ 0.6.
  - A dollar buys more of the foreign currency.

Depreciation is a decrease in the value of a currency relative to other currencies.

- Example: the Canadian dollar depreciates when it goes from C$ 1 = ¥ 96 to C$ 1 = ¥ 95.
  - A Canadian dollar buys fewer yen.

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Flexible versus Fixed Exchange Rates

The **foreign exchange market** is the market on which currencies of various nations are traded

- A **flexible exchange rate** is an exchange rate whose value is not officially fixed but varies according to the supply and demand for the currency in the foreign exchange market.
- A **fixed exchange rate** is an exchange rate set by official government policy.
- Can be set independently or by agreement with a number of other governments.
- Fixed rates can be set relative to the dollar, the euro, or even gold.

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The Real Exchange Rate 1

In the short run, domestic prices of goods are fixed.

- In the long run, this assumption is relaxed.

The **real exchange rate** is the price of the average domestic good relative to the price of the average foreign good when prices are expressed in a common currency.

The nominal exchange rate, *e*, is the number of units of foreign currency per dollar.

- To convert a foreign price, P^f, to the dollar price, $P^{f\$}$, divide P^f by *e*.

$$P^f / e = ¥\ 242{,}000 / (¥\ 110 / \$1) = \$2{,}200$$

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Purchasing a Domestic versus Imported Good

Choose between a U.S. computer and a comparable Japanese computer, based on price.

- US computer costs $2,400.
- Japanese computer costs ¥ 242,000.
- $1 = ¥ 110.

The Japanese computer cost is ¥ 242,000 / (¥ 110/$1) or $2,200.

- The Japanese computer is cheaper.

The relative price of the U.S. computer to the Japanese computer is $2,400 / $2,200 = 1.09.

- U.S. computer costs 9% more than the Japanese one.

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The Real Exchange Rate 2

$$\text{Real exchange rate} = \frac{\text{Price of domestic good}}{\text{Price of foreign good in \$}}$$

$$\text{Real exchange rate} = \frac{P}{P^f / e}$$

$$\text{Real exchange rate} = \frac{(P)\,(e)}{P^f}$$

$$\text{Real exchange rate} = \frac{(\$2{,}400)\,(¥\ 110\ /\ \$1)}{¥242{,}000}$$

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The Real Exchange Rate 3

In our example, the real exchange rate of 1.09 meant the U.S. computer is more expensive than the Japanese computer.

In the general case, the real exchange rate uses an average price of all goods and services in both countries.

- If the real exchange rate is high, domestic goods are expensive relative to foreign goods.
  - Net exports will tend to be low when the real exchange rate is high.

An increase in e increases the real exchange rate if P and P^f are constant.

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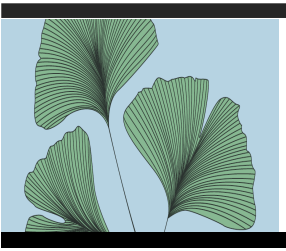

Exchange Rates

Real exchange rate.

- A high real exchange rate will attract imports and make it difficult to export.
- *NX* will tend to be low when the real exchange rate is high.
- Real and nominal exchange rates tend to move in the same direction.

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Strong Currency

A strong currency is unrelated to a strong economy.

- Dollar was strong in 1973, a time of recession.
- The dollar was weak in 1990s but the domestic economy was strong.
- A strong currency means its value is high in terms of other countries currencies.

Strong currencies reduce net exports.

- Japanese goods look cheap, so *NX* goes down.
- Lower sales and profits for U.S. industries.

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The Determination of the Exchange Rate in the Long Run

The law of one price states that if transportation costs are relatively small, the price of an internationally traded commodity must be the same in all locations.

Suppose wheat in Sydney was half the price of wheat in Mumbai.

- Buy wheat in Sydney, increasing demand and price.
- Sell wheat in Mumbai, increasing supply and decreasing the price.

The law of one price implies that real exchange rates prevail in the long run.

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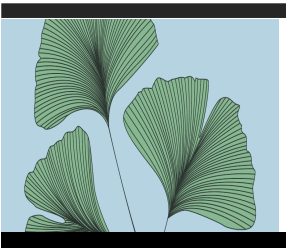

Purchasing Power Parity (PPP)

Purchasing power parity is the theory that nominal exchange rates are determined as necessary for the law of one price to hold.

- In the long run, the currencies of countries that experience significant inflation will tend to depreciate.
- Doesn't work as well in the short run.
- Doesn't work as well if lots of goods are not traded internationally or are not standardized.

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PPP – An Example

A bushel of grain costs.

- A$ 5 in Sydney and
- Rs 150 in Mumbai.
- For the price of the bushel of grain to be the same in both countries, the implied nominal exchange rate is A$ 1 = Rs 30.

Suppose that India experiences inflation and the bushel of grain now costs Rs 300 in Mumbai.

- The Australian dollar appreciates to A$ 1 = Rs 60.
- Price of the wheat is the same in both countries.

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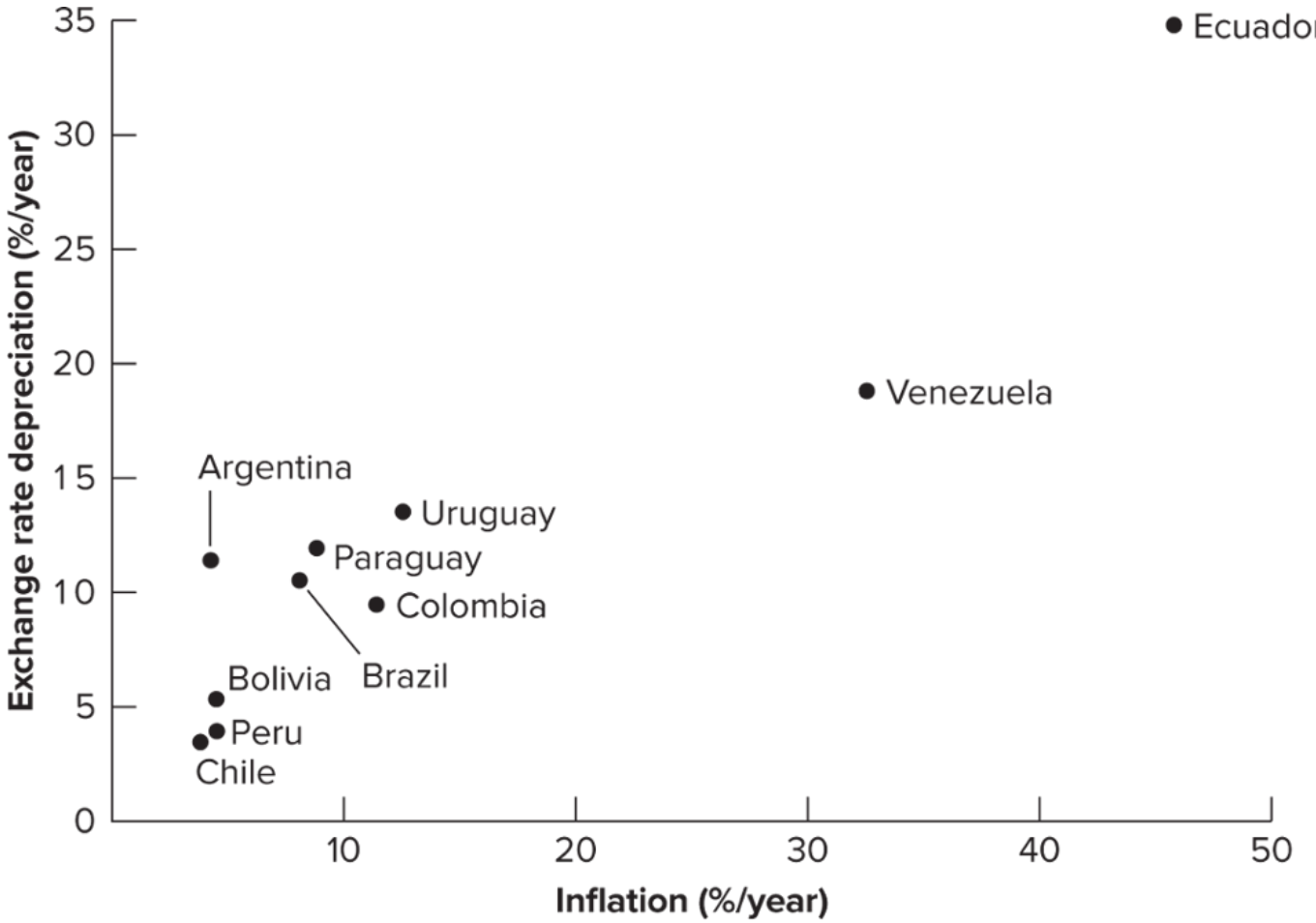
Inflation and Currency Depreciation in South America, 1995-2004



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Supply of Dollars in Foreign Exchange Market 1

Anyone who holds dollars is a potential supplier.

- US households and firms are the most common suppliers.

Supply curve has a positive slope.

- The more foreign currency each dollar can buy, the larger the quantity of dollars supplied.
  - This makes foreign goods cheaper.

When $1 = ¥ 100, a ¥ 5,000 item costs $50.

- If $1 = ¥ 200, that same ¥ 5,000 item costs $25.
- When the dollar appreciates, the quantity of dollars supplied increases.

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Demand for Dollars in Foreign Exchange Market 1

Anyone who holds yen can demand dollars.

- Japanese households and firms are the most common demanders.

Demand curve has a negative slope.

- The more foreign currency needed to buy a dollar, the smaller the quantity of dollars demanded.
  - This makes U.S. goods more expensive.

When $1 = ¥ 100, a $30 item costs ¥ 3,000.

- If $1 = ¥ 200, that same $30 item costs ¥ 6,000.
- When the dollar appreciates, the quantity of dollars demanded decreases.

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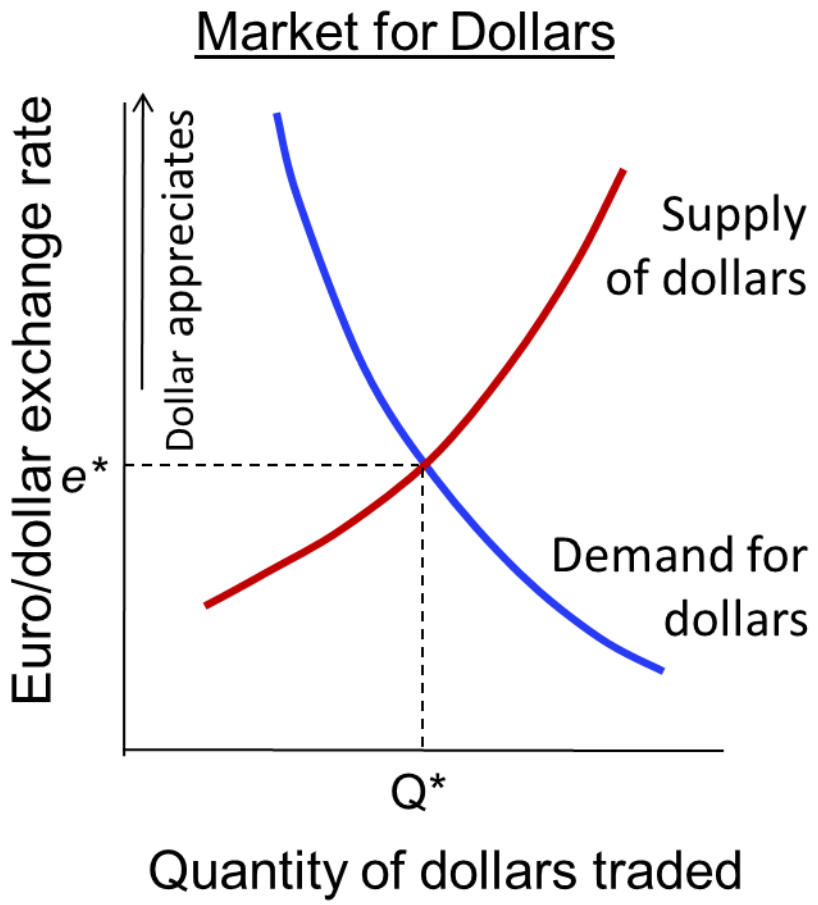
The Dollar – Euro Market

- The **market equilibrium value of the exchange rate** equates the quantities of the currency supplied and demanded in the foreign exchange market.
- Dollar appreciates *e** increases.
- Dollar depreciates if *e** decreases.



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Supply of Dollars in Foreign Exchange Market 2

Supply of dollars for euros is determined by.

- The preference for European goods.
  - The stronger the preference, the greater the supply of dollars.
- U.S. real GDP.
  - The higher GDP, the greater the supply of dollars.
- Real interest rate on European assets and the real interest rate on U.S. assets.
  - Supply of dollars will be greater if.
    - Real interest rate on European assets is higher.
    - Real interest rate on U.S. assets is lower.

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Demand for Dollars in Foreign Exchange Market 2

Demand for dollars by holders of yen is determined by.

- The preference for US goods.
  - The stronger the preference, the greater the demand for dollars.
- Real GDP in Europe.
  - The higher GDP, the greater the demand for dollars.
- Real interest rate on European assets and real interest rate on U.S. assets.
  - Supply of dollars will be greater if.
    - Real interest rate on European assets is lower.
    - Real interest rate on U.S. assets is higher.

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An Increase in the Supply of Dollars

Initial equilibrium at *E*.

Suppose consumers prefer the new washing machines made in Germany.

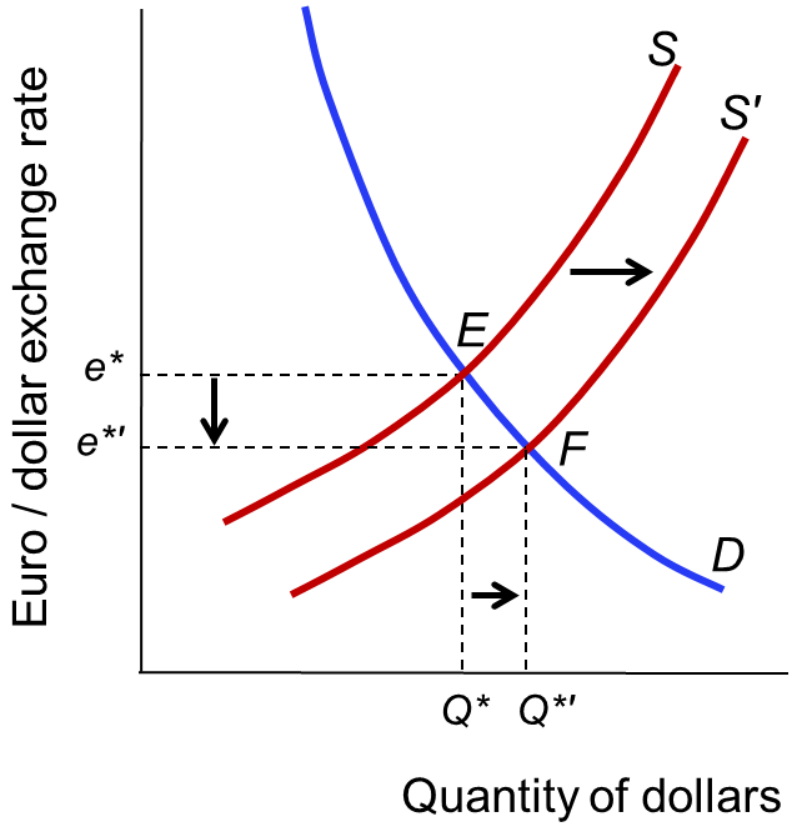
- Shift in preferences.

Increase in the supply of dollars shifts dollar supply curve to the right.

- New equilibrium at *F*.

Dollar depreciates to $e^{*\prime}$.

Quantity of dollars traded increases to $Q^{*\prime}$.



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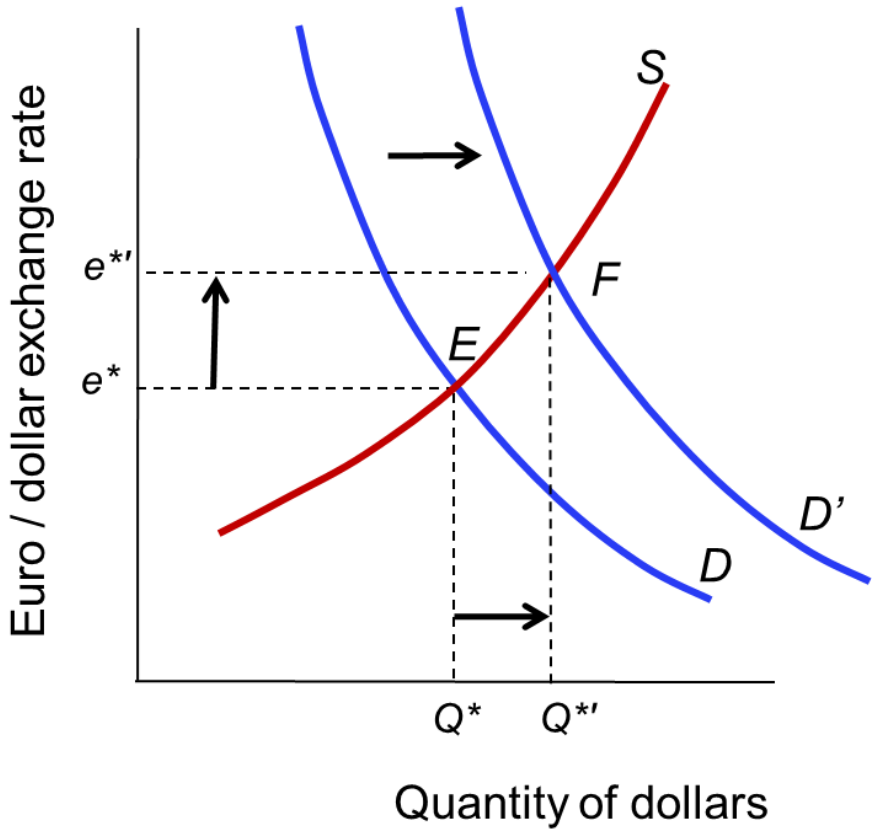
Monetary Policy and the Exchange Rate 1

Higher real interest rates in U.S. increase demand for dollars
Dollar appreciates
More dollars are traded



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Monetary Policy Results

Monetary policy was the main cause of recent changes in the dollar exchange rate.

- Dollar appreciation in the early 1980s.
  - Real interest rate rose from negative values in 1979 and 1980 to over 7% in 1983 and 1984.
- Dollar depreciation 2002-2005.
  - U.S. economy grew faster than our trading partners' economies.
    - Foreign exchange demand for imports increased.
  - Fed funds rate went from 6% in 2001 to 1% in 2003.
    - Demand for U.S. assets decreased.

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Monetary Policy and the Exchange Rate 2

Flexible exchange rates make monetary policy more effective.

- When the Fed tightens monetary policy, it sets off a chain of domestic events.

- And a chain of international events.

Monetary policy is more effective in an open economy with flexible exchange rates.

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Fixed Exchange Rates 1

Most large industrial countries use a flexible exchange rate.

- Small and developing countries may use a fixed exchange rate.

Fixed exchange rate system was set up after World War II.

- Began to break down in the 1960s.
- Abandoned by 1976.

Fixed exchange rates greatly reduce the effectiveness of monetary policy as a stabilization tool.

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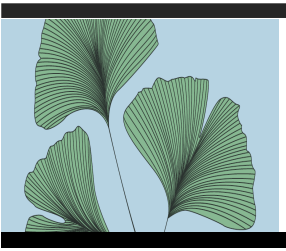

Fixed Exchange Rates 2

To establish a fixed exchange rate system, the government states the value of its currency in terms of a major currency.

- May use an average of the currencies of its major trading partners.

Government attempts to maintain the fixed exchange rate at its existing level.

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How to Fix an Exchange Rate

Devaluation is a reduction in the official value of a currency (in a fixed-exchange-rate system).

Revaluation is an increase in the official value of a currency (in a fixed-exchange-rate system).

How to Fix an Exchange Rate.

- Responses to an overvalued currency.
  - Devalue the currency.
  - Impose trade barriers.
  - Purchase the currency.

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How to Fix and Exchange Rate

- To purchase its own currency and maintain an overvalued exchange rate, a country must hold **international reserves**.
- A **balance of payments deficit** occurs when a country has a net decline in international reserves over a year.
- A **balance-of-payments surplus** occurs when a country has a net increase in international reserves over a year.

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Exchange Rates and Monetary Policy

Flexible exchange rates strengthen the effectiveness of monetary policy for stabilization.

Fixed rates require the central bank to choose between defending the currency and stabilizing the economy.

Fixed rates can be beneficial for small economies.

- Argentina fought hyperinflation by valuing its peso on par with the dollar.
  - Inflation quickly decreased and stayed stable for more than 10 years.
  - Fixed exchange system broke down because unsound domestic policies created fears that Argentina would default on international loans.

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Exchange Rates, Trade, and Integration

Fixed exchange rates have benefits.

- Predictability and stability in foreign transactions.
- Certainty of future value of the currencies.

However, **fixed rates are not fixed forever**.

- Sudden and unforeseen large changes are possible.
- Predicting exchange rates over the long term is difficult under either fixed or flexible rates.

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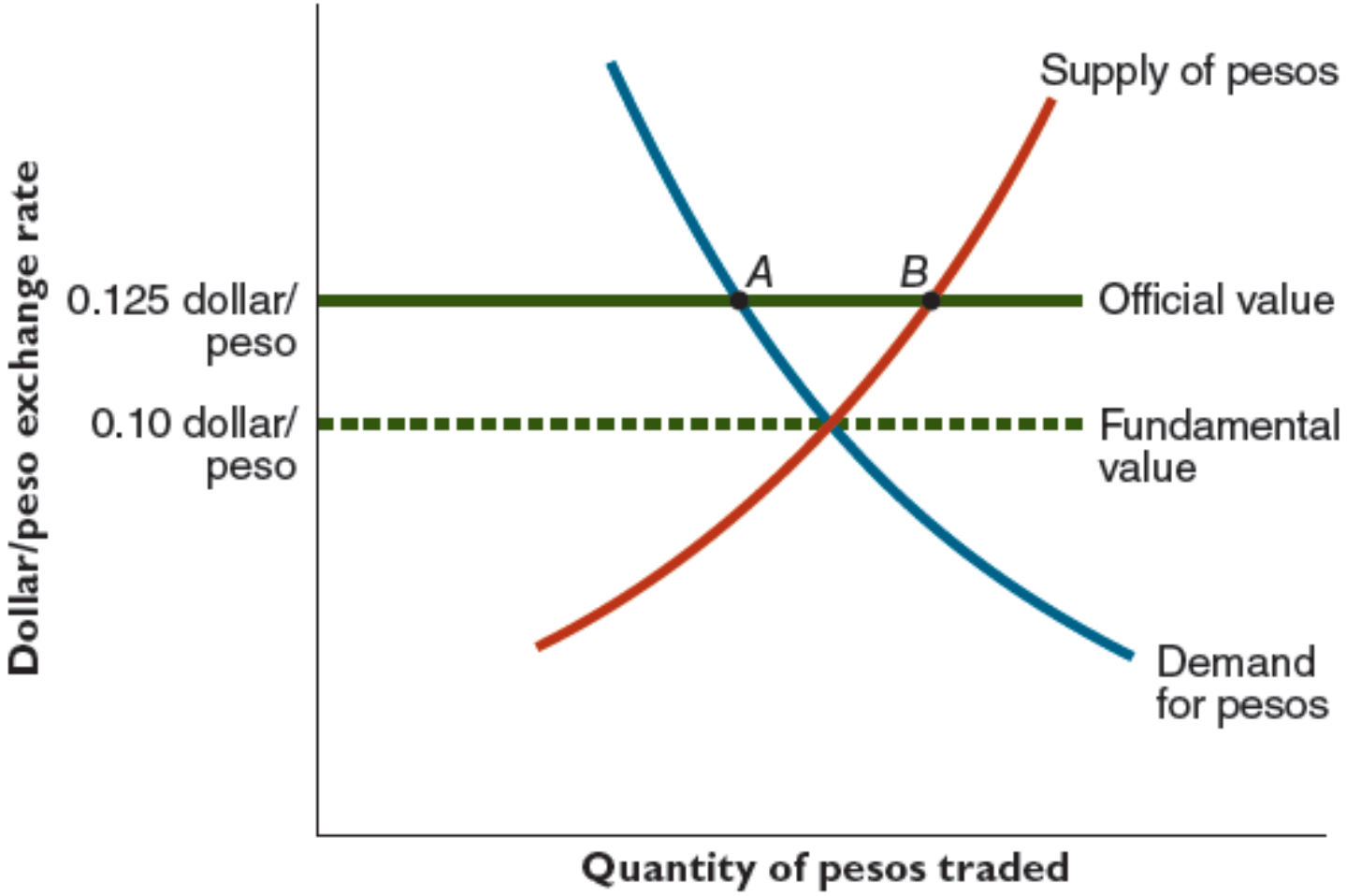
An Overvalued Exchange Rate



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Fixed Exchange Rates 3

Example.

- Latinia's balance-of-payments deficit.
  - Demand = 25,000 – 50,000*e*.
  - Supply = 17,600 + 24,000*e*.
  - Official value of the peso = 0.125 dollars.
  - Fundamental value.

    25,000 – 50,000*e* = 17,600 + 24,000*e*
  - Solving for *e:*

    7,400 = 74,000*e*

    e = 0.10

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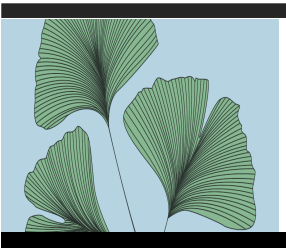

Fixed Exchange Rates 4

Example.

- As the official rate: 0.125.

  $D = 25{,}000 - 50{,}000\,(0.125) = 18{,}750$

  $S = 17{,}600 + 24{,}000\,(0.125) = 20{,}600$

- Excess supply = 1,850 pesos.
- Balance of payments deficit = (1,850 pesos) × (0.125 dollars/peso) = $(1,850/8) = $231.25.

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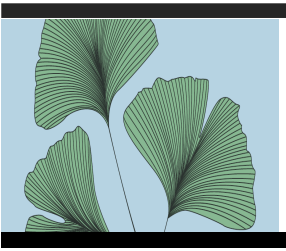

Speculative Attacks

- **Speculative attack** is a massive selling of domestic currency assets by financial investors.

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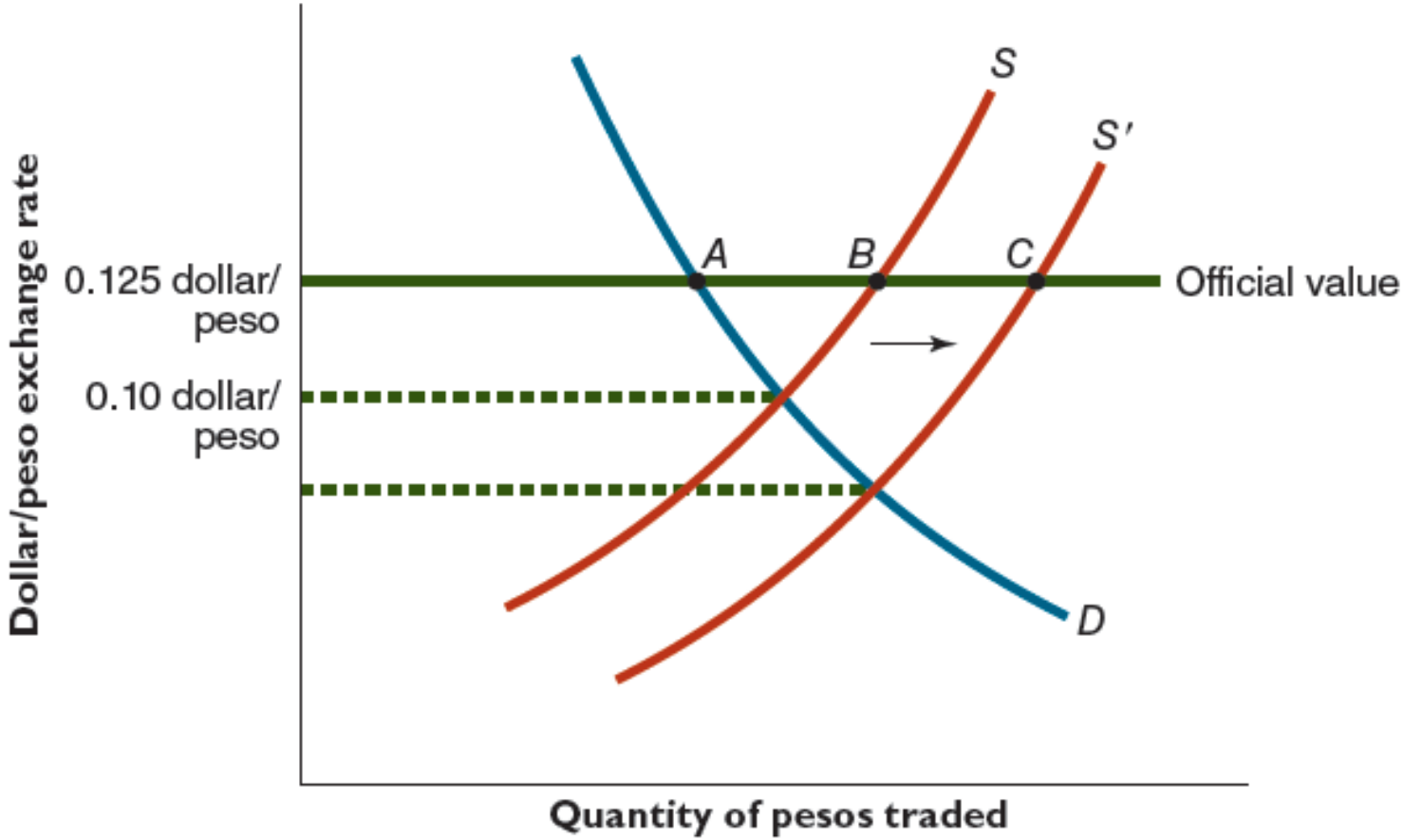
A Speculative Attack on the Peso



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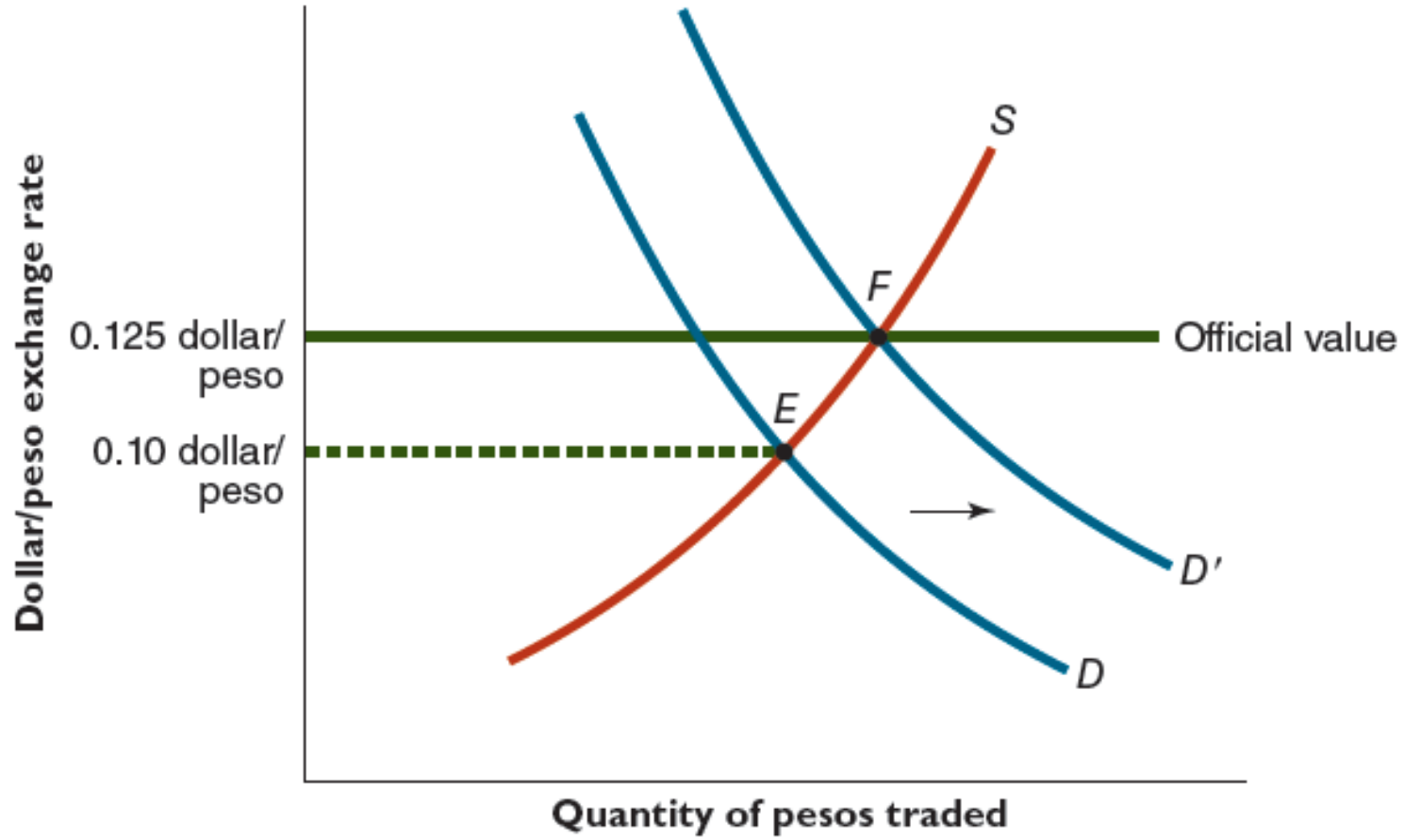
A Tightening of Monetary Policy Eliminates an Overvaluation



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Monetary Policy and the Fixed Exchange Rate

Observation.

- If monetary policy is used to set the fundamental value of the exchange rate equal to the official value, it is no longer available for stabilizing the domestic economy.
- The conflict monetary policymakers face, between stabilizing the exchange rate and stabilizing the domestic economy, is most severe when the exchange rate is under a speculative attack.

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Should Exchange Rates Be Fixed or Flexible?

Monetary Policy.

- Flexible exchange rates can strengthen the impact of monetary policy.
- Fixed exchange rates prevent the use of monetary policy to stabilize the economy.

Trade and economic integration.

- Fixed exchange rate proponents argue that fixed rates promote international trade.
- The risk of a speculative attack may make the country less attractive to investors and trade.

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The Euro 1

European Union was created by the Maastricht Treaty in 1991.

- Agreed to work toward adopting a common currency.
- The euro was phased in.
  - Began as an accounting unit.
  - Euro currency was phased in and local currency phased out in 19 member countries.

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The Euro 2

Countries with a single currency must have a common monetary policy.

- The European Central Bank became the central bank for the euro countries.

Countries sacrifice some control to be part of the euro.

- Economic conditions vary between countries and the central bank cannot respond to each.

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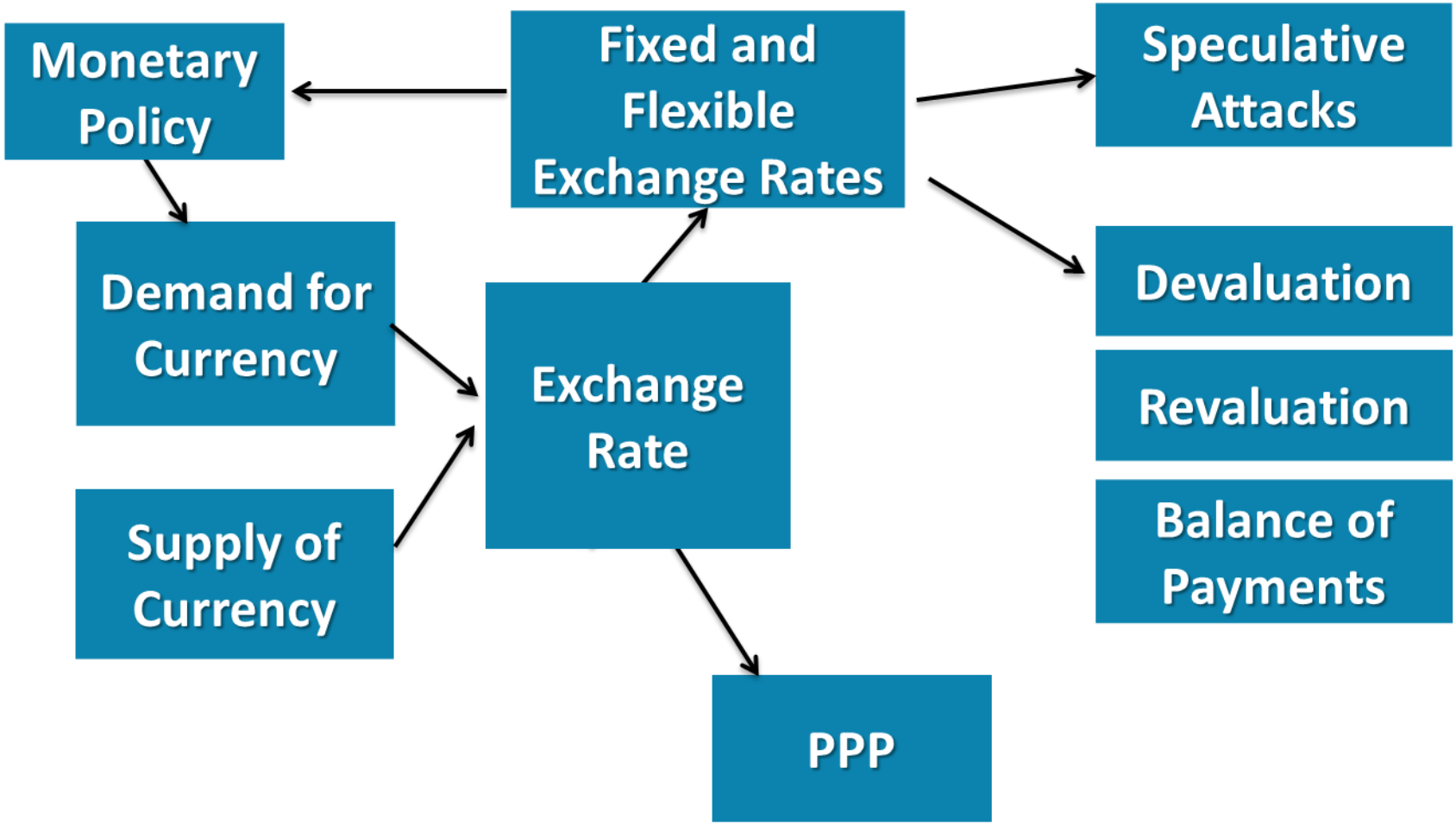
Exchange Rates and the Open Economy



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